Claims

1. A structure of pseudomorphic High Electron Mobility Transistor (pHEMT), which comprises a semiconductor substrate, a buffer layer on said semiconductor substrate, a non-doped strain layer on said buffer layer, a first non-doped spacer layer on said non-doped strain layer, a δ-doped carrier supplying layer on said first non-doped spacer layer, a second non-doped spacer layer on said δ-doped carrier supplying layer, a n-doped semiconductor layer on said second non-doped spacer layer, a p^+-doped semiconductor layer on said n-doped semiconductor layer, and a n^+-doped semiconductor covering layer over the aforementioned p^+-doped semiconductor layer. In the structure of the presented pHEMT, the first non-doped spacer layer, the second non-doped spacer layer, the n-doped semiconductor layer, and the p^+-doped semiconductor layer are made of the same material.
2. The structure as defined in claim 1 further comprising an additional δ-doped carrier supplying layer on said buffer layer, an additional non-doped spacer layer on said additional δ-doped carrier supplying layer, wherein said non-doped strain layer is on said additional non-doped spacer layer.
3. The structure as defined in claims 1 or 2, wherein said semiconductor substrate is a semi-insulating GaAs.
4. The structure as defined in claims 1 or 2, wherein said buffer layer inside is a non-doped GaAs.
5. The structure as defined in claim 1 or 2, wherein said non-doped strain layer is a $In_xGa_{1-x}As$, wherein x is $0.05 \sim 0.25$, and has a thickness ranging from *50 Å* to *200 Å*.
6. The structure as defined in claim 1 or 2, wherein said first non-doped spacer layer and said second non-doped spacer layer are $In_{0.49}Ga_{0.51}P$, and have a thickness ranging from *25 Å* to *100 Å*.
7. The structure as defined in claim 1 or 2, wherein said first non-doped spacer layer and said second non-doped spacer layer are $Al_xGa_{1-x}As$, wherein x is $0.2 \sim 0.5$, and have a thickness ranging from *25 Å* to *100 Å*.

8. The structure as defined in claim 1 or 2, wherein said δ-doped carrier supplying has a concentration of $\delta(n) = 1 \times 10^{12} \sim 1 \times 10^{13}\ cm^{-3}$.

9. The structure as defined in claim 2, wherein said additional δ-doped carrier supplying layer has a concentration of $\delta(n) = 1 \times 10^{12} \sim 1 \times 10^{13}\ cm^{-3}$.

10. The structure as defined in claim 2, wherein said additional non-doped spacer layer is GaAs, and has a thickness ranging from *25 Å* to *100 Å*.

11. The structure as defined in claim 1 or 2, wherein said n-doped semiconductor layer is $In_{0.49}Ga_{0.51}P$, and has a thickness ranging from *200 Å* to *1000 Å* and a concentration of $n = 5 \times 10^{16} \sim 5 \times 10^{17}\ cm^{-3}$.

12. The structure as defined in claim 1 or 2, wherein said n-doped semiconductor layer is $Al_xGa_{1-x}As$, wherein *x* is *0.2 ~ 0.5*, and has a thickness ranging from *200 Å* to *1000 Å* and a concentration of $n = 5 \times 10^{16} \sim 5 \times 10^{17}\ cm^{-3}$.

13. The structure as defined in claim 1 or 2, wherein sad p^+-doped semiconductor layer is $In_{0.49}Ga_{0.51}P$, and has a thickness ranging from *80 Å* to *200 Å* and a concentration of $p^+ = 1 \times 10^{18} \sim 4 \times 10^{19}\ cm^{-3}$.

14. The structure as defined in claim 1 or 2, wherein said p^+-doped semiconductor layer is $Al_xGa_{1-x}As$, wherein *x* is *0.2 ~ 0.5*, and has a thickness ranging from *80 Å* to *200 Å* and a concentration of $p^+ = 1 \times 10^{18} \sim 4 \times 10^{19}\ cm^{-3}$.

15. The structure as defined in claim 1 or 2, wherein said n^+-doped semiconductor covering layer is GaAs, and has a thickness ranging from *150 Å* to *400 Å* and a concentration of $n^+ = 1 \times 10^{18} \sim 4 \times 10^{19}\ cm^{-3}$.